MARKET IMPERFECTIONS AND AGRICULTURAL POLICY EFFECTS ON STRUCTURAL CHANGE AND COMPETITIVENESS IN AN ENLARGED EU

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Abstract

This paper examines the relationship between structural changes and EU agricultural policies and their implications in the context of the enlarged EU. The paper examines the impact of EU policies on the restructuring and competitiveness of farms in the new member states taking into account imperfections in rural markets. Using a model of rural factor market imperfections in the new EU member states, including both high transaction costs and imperfect competition, we analyse the effects of EU policies on the distribution of policy rents, on the restructuring of farms, and on aggregate productivity. In addition, we draw upon the findings of a series of other studies to identify the effects and constraints of rural development and structural policies in these countries for enhancing the competitiveness of the various farm structures.

Keywords: CAP, competitiveness, market imperfections, EU25

Introduction

Important changes have taken place in farm structure in the EU-25 since eight Central and Eastern European countries (CEECs) joined the EU in 2004. Some of the new EU member states (NEMS) are dominated by family farms, much like in the EU15. In some, such as Poland, farms are often considered to be too small to be competitive and important structural changes need to take place. In other NEMS, such as Slovakia and the Czech Republic, agriculture is dominated by very large scale farms. Corporate farms are on average more than 1100 hectares. But these farms are said to require important further restructuring to become or remain competitive in the EU and in international markets (Gorton and Davidova). Hence, continued restructuring is important in these countries.

Another form of structural change is in the labour market. Adjustments in agricultural employment have been dramatic in almost all NEMS since 1989. However the patterns of change have differed strongly (Swinnen, Dries, and Macours). In some countries (e.g. Hungary, Czech Republic, Estonia) there was initially a major outflow of labour from agriculture, while in others there was an inflow of labour (e.g. Poland, Lithuania). However over the past five years, there has been a consistent decline in employment in virtually all the NEMS, a restructuring that is essential for continued growth of labour productivity. The outflow of labour is similar to that in the EU15. As demonstrated elsewhere these changes were affected strongly by the farm restructuring process (Dries and Swinnen, 2002; Swinnen, Dries, and Macours).

Some of the most dramatic changes taking place, with major implications for the competitiveness of the farms in the NEMS, is the inflow of investment (often foreign investment) into the food industry. Through vertical spillover effects and vertical coordination in the supply chains, food industry investment has contributed significantly to access to credit, improved inputs, technology and know-how. In turn this has resulted in strong growth in product quality, investments, productivity, and competitiveness of the entire chain (Dries and Swinnen, 2004).

The focus in this paper is on how accession to the EU, and in particular application of the CAP in the NEMS is affecting agricultural restructuring and its implications for competitiveness. Several studies have analysed the impact of EU enlargement on EU expenditures, protection levels, commodity markets, trade and the WTO (e.g. Banse, Munch, and Tangermann; Hertel, Brockmeier, and Swaminathan; Münch). However, two important limitations of these studies are that they generally ignore the presence of imperfections in factor markets and that they pay relatively little attention to

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the income distribution effects within the NEMS economies. The latter is a major weakness, since much of the policy debate centred on how the implementation of the CAP would affect rural incomes in NEMS (European Commission; NIAE).

The absence of factor market imperfections is also an important shortcoming, since rural factor markets are characterized by such imperfections, due to the transition process and more general rural development problems. In particular, with respect to CAP payments per unit of land – which make up a large share of the CAP subsidies in the NEMS – imperfections of the land markets are crucial since they may have a significant impact on both the efficiency and distributional effects of payments. Several studies document that land markets in the NEMS function imperfectly because land sales are constrained, transaction costs in the land markets prevent efficiency enhancing land exchanges, and large farm corporations use their monopoly power in local or regional land markets (Dale and Baldwin; World Bank, 1999). We focus in particular on transaction costs and imperfect competition.

The land reform process has created a class of new, sometimes absentee, land owners while land is used by a mixture of smaller individual farms and large-scale corporate farms. These corporate farms are mostly successor organizations to the former collective and state farms. They are, on average, between 300 and 1200 hectares, and their share of land use is around 90% in Slovakia, 75% in the Czech Republic, 50% in Bulgaria, 40% in Hungary, and more than 30% in Romania and Estonia Moreover, in most countries they use a disproportionate share of the best agricultural areas of the country, which are especially affected by CAP payments.

Large scale corporate farms continue to use large parts of the land for a variety of reasons. One is that historically, they were traditionally the users of the land. New owners face significant transaction costs if they want to withdraw their land and reallocate it. Transaction costs include those involved in bargaining with the farm management, in obtaining information on land and tenure regulations, in implementing the delineation of the land and dealing with inheritance and co-owners (Mathijs and Swinnen, 1998; Prosterman and Rolfes).

The domination of large corporate farms also leads to imperfect competition in the land market. The combination of imperfect competition and transaction costs has a strong impact on land prices. For example, Vranken and Swinnen find that in Hungary land prices are lower in regions where corporate farms dominate. In several CEECs there is a large gap in rental prices between land used by corporate farms and that used by individual farms. For example, in the Czech Republic and Slovakia land rents paid by corporate farms are generally much lower: most vary between 50% and 20% of the rents paid by family farms. Further, corporate farms also reduce payments by paying in kind instead of in cash. A study by IME found that in Bulgaria, corporate farms generally paid their rents in kind, while family farms were much more likely to pay cash or mixed cash/in-kind.

The objective of our research is to analyze explicitly how these land market imperfections affect the welfare effects of introducing the CAP in the CEECs, or as of 2004, the NEMS. In this paper we develop a theoretical framework and use a partial equilibrium model of the land market to analyze how the income and efficiency effects of the implementation of CAP area payments are affected by transaction costs and imperfect competition in the land market in the NEMS.

The analysis – and the impact of EU accession – is complicated by the reform of the CAP which was agreed in 2003 by the EU Council of Ministers and which will be implemented first in the EU15 and only later in the NEMS. This reform will have a significant impact on the mechanism of CAP support in the future in the NEMS, and in the last part of the paper we analyze the effects of the introduction of this policy reform.

The paper is organized as follows. In section 2 we develop a model of imperfections in the land market. Section 3 analyses the effects of current CAP subsidies after accession. Section 4 analyses how these effects change with unequal access to subsidies. In the next section we study how reform of the CAP affects the results and in section 6 we analyze the impact of EU accession on land market imperfections and how this affects the results. The final section offers some concluding observations.

The Model

Before transition, effective land rights in CEECs were in the hands of the state, or the collective

farms. Land was used by large-scale state and collective farms. Land reform in the early 1990s reallocated most land property rights to individual households in CEECs (referred to as "*landowners*"). Land reform took several forms. The main form in CEECs was restitution of land to former owners (Lerman; Swinnen, 1999). More or less simultaneously important farm restructuring took place. This included a privatization and management restructuring, including the reorganization of collective and state farms into private cooperatives and farming companies (referred to as "*corporate farms*" or CF, typically large-scale). The most dramatic restructuring was the break-up of collective and state farms into household plots and family farms (referred to as "*individual farms*" or IF).

To keep the analysis tractable we will model these developments in a stylized way. First, consider a situation where all the land is now owned by individual households, but still used by corporate farms. (This reflects a situation where the land reform is formally completed, and farms have been privatized, but no restructuring has occurred.) Second, we assume that land transactions take place exclusively through rental agreements. This is consistent with the majority of land transactions in CEECs (Swinnen and Vranken; VUZE). Including both sales and rental transactions would seriously complicate the analysis without yielding much additional insight. Landowners receive a rent r for each unit of land that they rent to corporate farms. Several households, landowners or not, consider starting up an individual farm. They can either withdraw land from corporate farms or rent from landowners who currently rent to corporate farms. In both cases the price they have to pay per unit of land is the sum of the rent paid by the corporate farms, r, (explicitly for rented land or implicitly as opportunity costs) and transaction costs, t, involved in withdrawing land from the corporate farms.

Transaction costs

Transaction costs in land exchange can be very substantial in CEECs. When a landowner wants to withdraw land from the CF there are several reasons why transaction costs may arise. These include the costs of bargaining, costs of enforcing the right of withdrawal, and those related to asymmetric information, co-ownership, unclear boundary definition and unknown owners. First, while the withdrawal procedure is usually stipulated by law, it is also determined by the willingness of the CF to implement it (Mathijs and Swinnen, 1998). For example, in Slovakia the CF has the right to give a plot of land to owners located in a different place than the one specified in the ownership title (based on former boundaries) if the plot affects the integrity of the CF's land operation. The landowner only has a usage right to the new plot while s/he keeps the ownership right to the original plot located in former boundaries. This asymmetry obviously increases the costs for the landowner, since s/he can be deterred from withdrawal by being offered a plot located far from her/his operation or the plot may be of lower soil quality. The laws in Bulgaria, Slovenia and Hungary contained similar transaction cost increasing features (see Bojnec and Swinnen; Mathijs; Prosterman and Rolfes; Swain).

Second, CF managers typically have more information than landowners about the economic situation of the farm and about regulations governing local land transactions. This is especially the case for landowners who have not been involved in agriculture, or are living outside the village where their land is located, or are pensioners (Swain).

Third, other transaction costs follow from co-ownership of land, unclear boundary definition, and the problem of unknown owners. In many CEECs, land was never formally nationalized during the Communist regime, although property rights were controlled by the regime and the collective farms. Hence, legal ownership of land remained private (Swinnen, 1999). However, land ownership registrations were poorly maintained, if at all, and in many areas land consolidation was implemented, wiping out old boundaries and relocating natural identification points (such as old roads and small rivers). The loss of information on registration and boundaries produced a large number of unknown owners in some transition countries (Dale and Baldwin). In addition, unsettled land inheritance within families during the socialist regime caused fragmentation and a large number of co-owners per a plot of land. For example, according to OECD (1997), in 1993 approximately 9.6 million plots were registered in Slovakia (0.45 hectares per plot), and each plot was owned by on average 12 to 15 people. As Dale and Baldwin put it, "a single field of twenty hectares may have hundreds of co-owners". In the Czech Republic, there were 4 million ownership papers registered in 1998 for 13 million parcels, with an average parcel size of 0.4 hectares. In Bulgaria, a recent study found that 50%

of the plots were co-owned, often by several people (Vranken, Noev, and Swinnen). The average number of co-owners was more than two (excluding husband and wife co-ownership). Some co-owners may be unknown, may not be in the country, or may be scattered all over the country. This raises the costs of land withdrawal as since this normally requires agreement from co-owners. The study finds that co-owned plots of land in Bulgaria are more likely to be used by corporate farms.

Finally, other costs related to land transfers include notary fees, taxes and other administrative charges. Studies for Poland, Bulgaria, Lithuania and Romania, estimate these at between 10% and 30% of the value of a land transaction (Prosterman and Rolfes; World Bank, 2001).

To model these transaction costs, we need to distinguish between those that are specific to the plot, to the owner, and to the user. Transaction costs will depend on the distribution of land among households and farms, on individual characteristics of landowners, and on the fragmentation of the land. To reduce these dimensions we assume that initially all plots of one owner are used by one corporate farm. Define G^j as the transaction costs specific to the relationship between owner j and the corporate farm. These costs can be due to asymmetric information and bargaining. Define g^{ij} as the transaction costs specific to plot i of owner j. Transaction costs may differ per plot due to the number of co-owners or boundary uncertainty.

We can now derive the transaction costs per unit of land, t^{ij}, as a function of the plot- and owner-specific transaction costs:

$$(1) \qquad t^{ij} = \frac{g^{ij}}{a^{ij}} + \frac{G^j}{A^j}$$

where and a^{ij} and A^j are, respectively, the size of plot *i* and total land owned by owner j with $A^j = \sum_i a^{ij}$.

First, it follows from the first term of (1) that fragmentation of land ownership increases per unit transaction costs. Ceteris paribus, with fragmentation plot size will be smaller and hence the transaction costs per plot higher. This increases transaction costs per unit of land: $\partial t^{ij} / \partial a^{ij} < 0$ with A^j fixed.

Second, when land ownership is distributed unequally among households, transaction costs increase with the amount of land withdrawn from corporate farms. The reason is that part of the transaction costs G^j are fixed per owner. Hence, ceteris paribus, larger owners will have lower per unit land transaction costs, and will be withdrawing land first. Smaller owners of land have larger transaction costs per unit of land and hence the premium that IF have to pay to access the land of small land owners will need to be larger.

Third, transaction costs per unit of land will be constant if land ownership is distributed equally (A^j=A for all j) and homogenously (the plot size distribution is the same for all landowners), and if landowners and plots do not vary in other characteristics. In this case g^{ij}=g, G^j=G and a^{ij}=a for all i and j, and per unit transaction costs, t, are constant:

$$(2) \qquad t = \frac{g}{a} + \frac{G}{na}$$

where n is the number of plots per landowner. Fragmentation affects the level of t but not the distribution.

In reality, land ownership is fragmented and relatively egalitarian in the CEECs. The egalitarian distribution is due to a combination of factors (Swinnen, 1997). In many CEECs the Communist regimes, immediately after World War II and prior to collectivization, implemented radical land reforms, taking away land from large land owners, religious institutions and groups that had supported pro-Nazi regimes, distributing it among small tenants, landless people, and pro-communist groups. In other countries, further egalitarian land reforms were implemented during collectivization; and in yet other regions (southern Europe), the Ottoman Empire had left an egalitarian land ownership structure.

Land restitution restored, and in fact reinforced, the egalitarian land distribution. In those countries where restitution was not widely implemented (Slovenia and Poland) or mixed with other land reform procedures (Hungary and Romania), land ownership is also relatively equally distributed.

This implies that a fixed transaction cost per unit is a reasonable approximation of reality in many regions of the CEECs. However, in our analysis and mathematical derivations we use a more general specification that allows for both fixed and (monotonically) increasing transaction costs. To reduce the complexity of the graphs, we use only fixed per unit costs. Our derivations show that few of the results are affected by this assumption. Where it matters, we discuss the implications.

The equilibrium with perfect competition

The land decision-making problem of a profit-maximizing individual farm (IF) is:

$$\text{(3)} \qquad \text{Max } \prod^{I} = pf^{I}(A^{I}) - (r+t)A^{I}$$

where p is output price, A^I is amount of land rented by the IF, $f^I(.)$ is production function for which $\frac{\partial f^{I}(A^{I})}{\partial A^{I}} > 0$ and $\frac{\partial^2 f^{I}(A^{I})}{\partial A^{I\,2}} < 0$. The first order condition for optimal land use is:

$$\text{(4)} \qquad p\frac{\partial f^{I}(A^{I})}{\partial A^{I}} = (r+t).$$

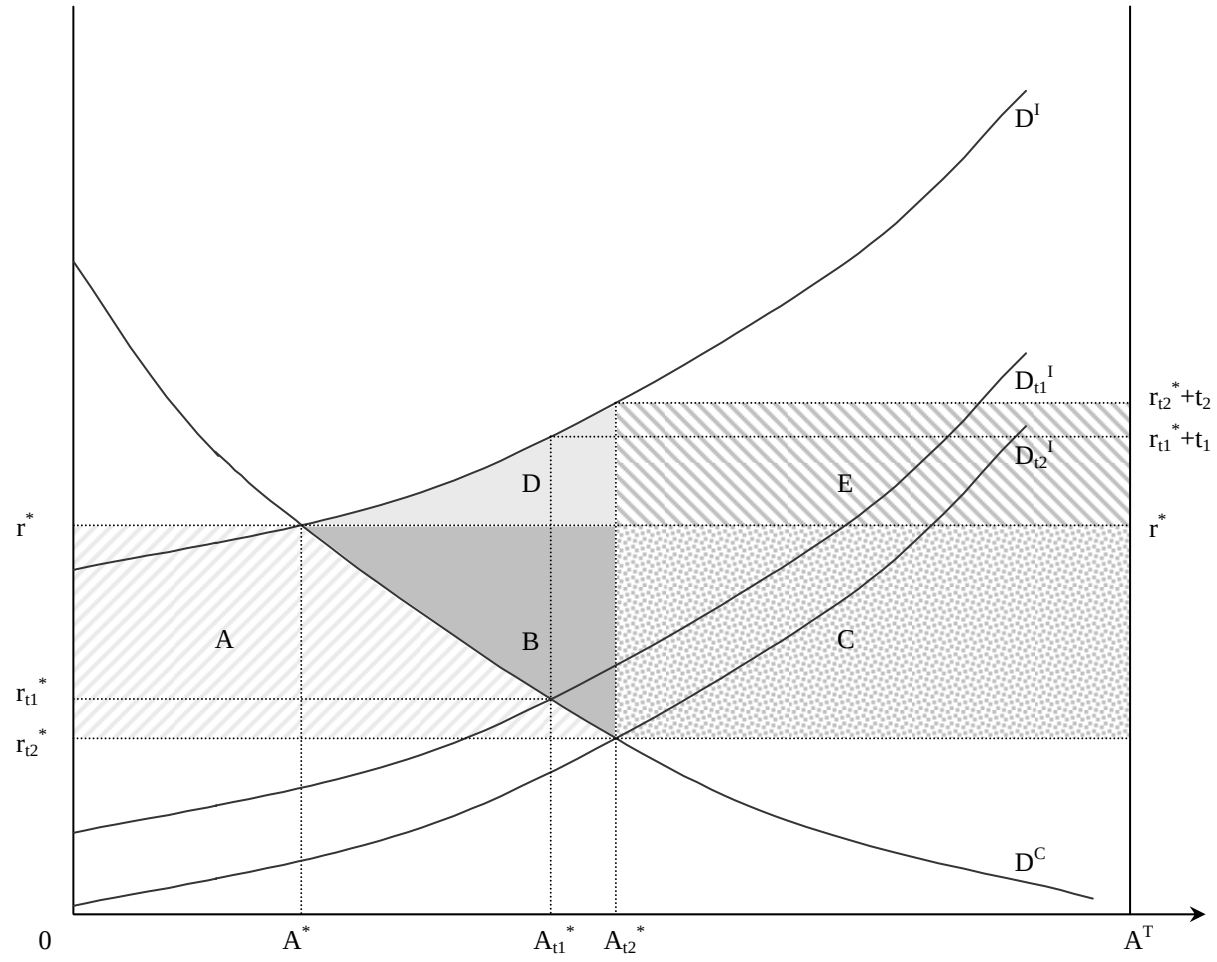

Figure 1. Equilibria in the land market with transaction costs

The optimal level of land rented is where the marginal value product of land, represented by the left hand side of (4), equals the IF's marginal cost of land, r + t. The marginal cost is the rental rate an IF has to pay to a landowner, and which equals the corporate farm rental rate (r) plus transaction costs

per unit of land (t). Condition (4) defines the demand for land of the individual farm. Aggregating this over all (potential) IFs yields the total demand for land by individual farms, D^I. Total IF demand for land is represented in Figure 1 by D^I for zero transaction costs (t=0) and D_{t1}^I and D_{t2}^I for transaction costs, t_1 and t_2, respectively, with $t_2 > t_1 > 0$. The horizontal axis in Figure 1 represents the amount of land, with $A^I = A^T - A^C$. The vertical axis measures land rental price.

Consider first that corporate farms are also price takers in the land market (this assumption will subsequently be relaxed). In this case the CF demand for land is represented by D^C. When there are no transaction costs the equilibrium in the land market is at (A^*, r^*). The land used by the CF equals A^* and the land used by the IF is $A^T - A^*$. With transaction costs, the equilibrium is at (A_{t1}^*, r_{t1}^*) and (A_{t2}^*, r_{t2}^*) for transaction costs t_1 and t_2, respectively. With increasing transaction costs, the share of land used by corporate farms is higher and the rent they pay is lower (Figure 1). Transaction costs allow CF to use more land and at lower costs. Their gains are equal to area A for transaction costs t_2.

Only the CF benefit from these reduced rents. The land rental price for IFs is the CF price plus transaction costs. The land rental price for IFs *increases* with increasing costs: from r^* to $r_{t1}^* + t_1$ and $r_{t2}^* + t_2$, for t_1 and t_2, respectively. The losses of IFs are equal to area DE for t_2. Landowners also lose because their income from land rents declines: without transaction costs they receive r^* per unit of land; with costs t_2 they only get r_{t2}^* (which equals the rental rate of corporate farms and the net per unit payments from IFs after covering transaction costs). Their losses are equal to area ABC for t_2. The net aggregate welfare losses with t_2 are equal to area CE, measuring the total transaction costs and area DB, measuring the deadweight costs of the induced economic distortions.

Imperfect competition

In several CEECs corporate farms may not be price takers in the land rental market. For example, in countries such as Slovakia where they occupy around 90% of the land, corporate farms are likely to have important market power. To model this, assume that there is one (representative) corporate farm, CF, which recognizes that its land rental decisions will influence the rental price. The CF is not a monopolist since there is a group of (potential) individual farms who are price takers in the rental market. The IFs will rent land up to the point where their demand equals their rental price (i.e. r+t). The CF will take the reactions of the IFs to changes in the land rental price into account: it will adjust its land renting to maximize profit subject to the behaviour of the IFs.

In this situation, the objective function of the corporate farm is the following:

$$(5) \qquad \text{Max } \prod^C = pf^C(A^C) - r(A^C)A^C$$

where Π^C are CF profits, A^C is amount of land rented by the CF, $r(A^C)$ represents the rental rate as a function of A^C, with $\frac{\partial r}{\partial A^C} > 0$. $f^C(.)$ is the CF's production function for which $\frac{\partial f^C}{\partial A^C} > 0$ and $\frac{\partial^2 f^C}{\partial A^{C2}} < 0$.

The first order condition is:

$$(6) \qquad p\frac{\partial f^C}{\partial A^C} = r + A^M \frac{\partial r}{\partial A^C}$$

where A^M is the optimal land allocation of the CF.

The left hand side of condition (6) represents the marginal benefit, i.e. the marginal value product of land, and the right hand side is the marginal cost of land for the CF. The marginal cost of land includes both the rental rate and changes in this when the CF varies the amount of land rented. The corporate farm will take into account increases in the price of land when it rents more land. It will choose its land use where the marginal cost of land renting equals the marginal benefit. This is represented in Figure 2 (for simplicity, we assume there are no transaction costs, i.e., t = 0). MC^C represents the marginal cost function of land renting for the CF. The equilibrium land use by the

corporate farm is where MC^C equals D^C, i.e. at A^M. The resulting CF rental price is r^M.

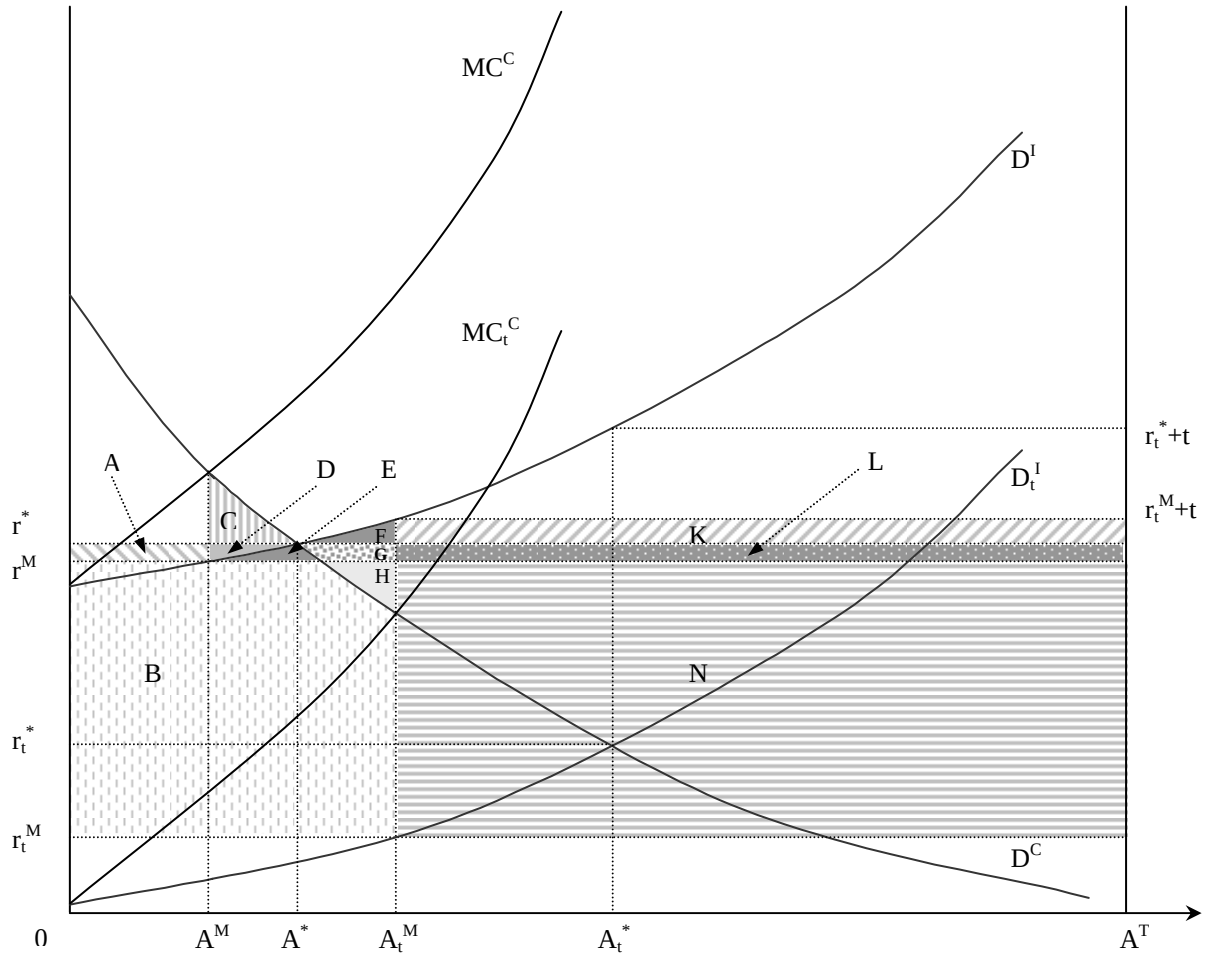

Figure 2. Effect of imperfect competition and transaction costs in the land market

Compared to the competitive market equilibrium (A^*, r^*), the domination of the market by the CF leads to a reduction of land use by the CF ($A^M < A^*$), and a corresponding increase in land use by the individual farms. The land rental price is lower for all farms ($r^M < r^*$). The surplus gains of the CF are area A – C (>0). The IFs also gain, by area EGL. Landowners lose rental income equal to area ADEGL. The effect on rural households depends to what extent they are employed by the CF, are IFs, or landowners. For rural households who are both landowner and individual farmer, the losses in rental income may outweigh the gains in farm profits from lower rental prices. Finally, the total welfare effects are negative. Social costs due to the market power of the CF equals area CD.

Figure 2 also shows the situation of imperfect competition with transaction costs t. In this case, the equilibrium is at (A_t^M, r_t^M). The CF rental price falls further to $r_t^M < r^M < r^*$: both the transaction costs and the market power of CF push the CF rental price down. Compared to the competitive market equilibrium with transaction costs (A_t^*, r_t^*), the domination of the market by the CF leads to a reduction of land use by the CF ($A_t^M < A_t^*$), and an increase in land use by individual farms.

The combination of imperfect competition and transaction costs results in extra benefits for the CF. Relative to the competitive equilibrium without transaction costs (A^*, r^*), the surplus gains of the CF is area ABDE. Landowners lose twice as both factors put a downward pressure on rental prices. Their combined loss equals area ABDEGHLN. For individual farms the two market imperfections have opposite effects. IFs gain from lower rental prices and more land with imperfect competition, but lose from higher rental prices and less land with transaction costs. The net effect depends on the relative size of the transaction costs. With low costs, the benefits from CF market power will dominate. With

high costs (as in Figure 2), the losses due to transaction cost will dominate. The net loss for IFs is equal to area FK. The total welfare effects are negative. Compared to the competitive market equilibrium (A^*, r^*), (A_t^M, r_t^M) implies losses equivalent to – KLN –FGH, where KLN represents total transaction costs incurred and FGH is the market distortions.

Impact of CAP payments

Since the 1992 MacSharry and Agenda 2000 reforms, the vast majority of CAP subsidies are so-called direct payments (DPs). In 2001, 27.4 billion euro was spent in the EU15 on direct payments alone. They make up around two-thirds of the CAP budget and include both per hectare payments for some commodities and payments per animal for some livestock activities. They formed one of the most hotly disputed issues in the EU enlargement negotiations, as the NEMS insisted on getting full access to DPs, while EU15 member states only wanted to give partial DPs. The ultimate agreement, reached in Copenhagen in 2002, allowed for DPs to be partially introduced from the date of accession and then gradually increased, from maximum 55% in 2004 to 100% in 2010.

Define s as the subsidy (area payment) per unit of land, and assume that all land in the analysis qualifies for subsidies. The objective function of the IF then changes to

$$\prod^I = pf^I(A^I) - (r + t - s)A^I. \quad (7)$$

The subsidy s shifts the value marginal product of land curve by s:

$$p\frac{\partial f^I(A^I)}{\partial A^I} = r + t - s. \quad (8)$$

The objective function for the CF changes as well.

Proposition 1: *Area payments benefit only landowners, with and without transaction costs and perfect competition in the land market.*

Proof: see Ciaian and Swinnen.

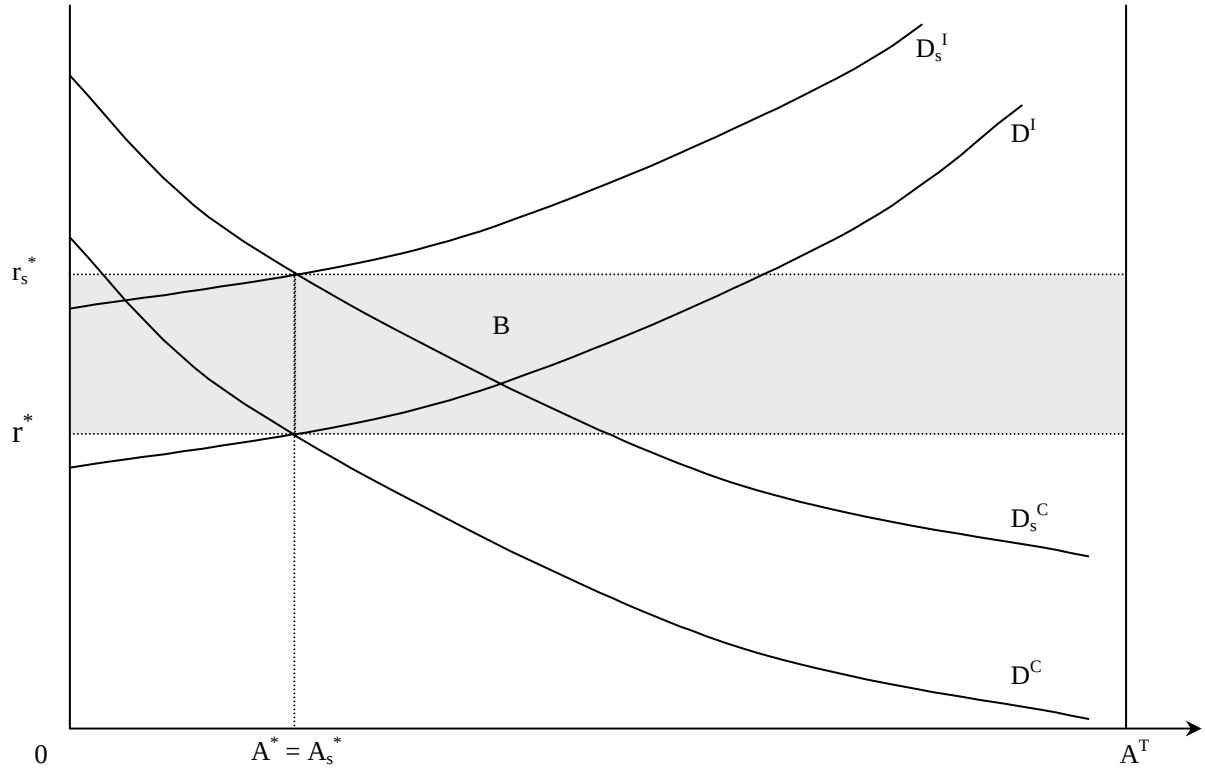

Figure 3. Effect of subsidies without imperfect competition and transaction costs in the land market

Figure 3 shows the first part of the result. Without transaction costs and with perfect competition in

the land market, the IF and CF land demand functions with subsidies are D_s^I and D_s^C, respectively, and the equilibrium shifts from (A^*, r^*) to (A_s^*, r_s^*). Notice that land allocation does not change: $A^* = A_s^*$. Furthermore, the surpluses of the CF and IF are not affected. Their incomes remain unaffected by the subsidy. All the gains go to landowners. Their total gains are equal to the area B, which is equal to the total subsidies $sA^T = (r_s^* - r^*)A^T$.

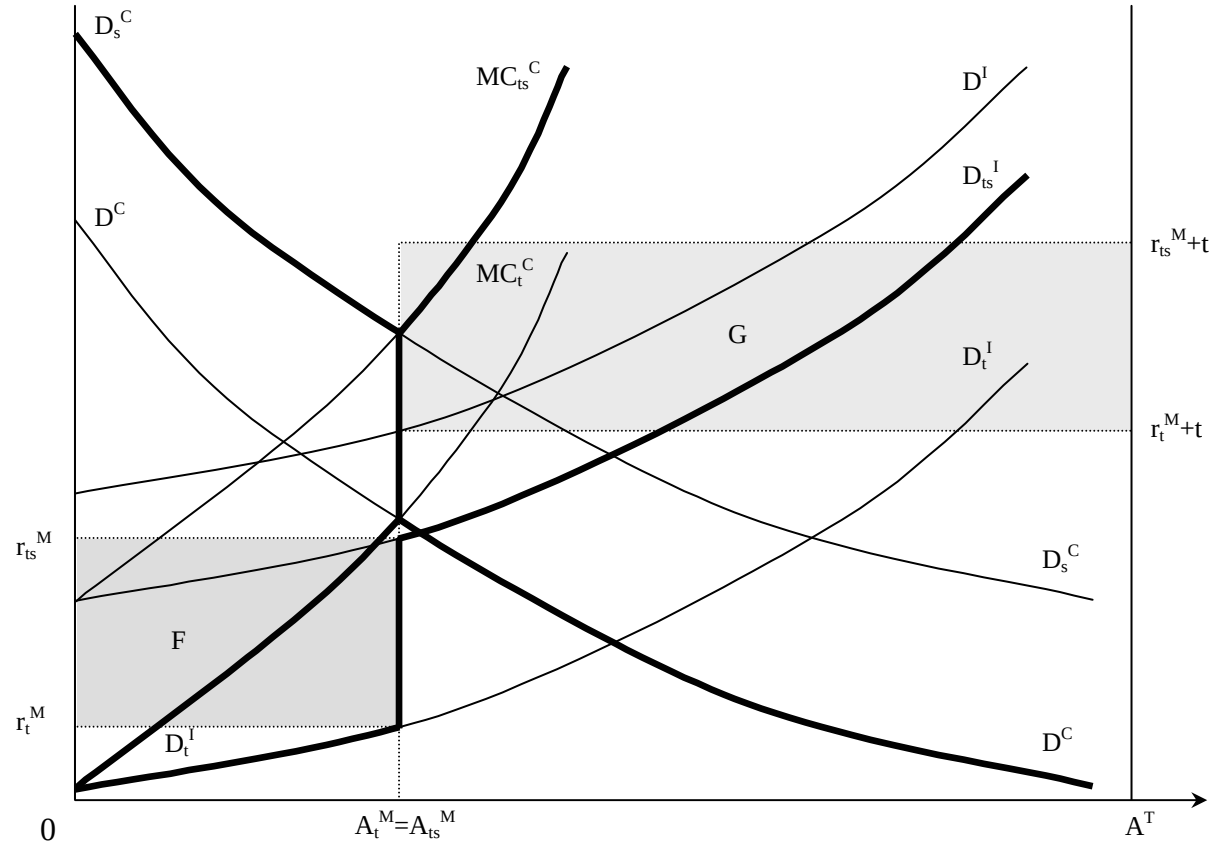

Figure 4. Effect of subsidies with imperfect competition and transaction costs in the land market

This result holds in general. With transaction costs and imperfect competition in the land market, all the benefits of subsidies still go to landowners. Figure 4 shows the general case. The subsidy shifts the marginal cost function from MC_t^C to MC_{ts}^C. With transaction costs t and imperfect competition, the subsidy causes the equilibrium to shift from (A_t^M, r_t^M) to (A_{ts}^M, r_{ts}^M). The land allocation does not change: $A_t^M = A_{ts}^M$. Rental prices increase from r_t^M to r_{ts}^M for corporate farms and from r_t^M+t to r_{ts}^M+t for individual farms. The difference between both rental prices is exactly the size of the subsidy ($s = r_{ts}^M - r_t^M$). As a result the subsidies are fully captured by land price increases and the surplus of neither CF nor IF is affected. All the gains go to the landowners – as the sum of areas F + G, which equals the subsidy per unit of land times the total amount of land used ($sA^T = (r_{ts}^M - r_t^M)A^T$).

Unequal access to subsidies

An important assumption underlying these results is that both corporate farms and individual farms get the same subsidies per hectare. In reality this may not be correct. Access to payments may be complicated for small individual farmers because of administrative constraints and problems in satisfying requirements ("cross-compliance"). If so, some of the individual farms may not get access to the payments.

Proposition 2: *With unequal subsidies, area payments benefit landowners and CF, while IF lose on average.*

Proof: see Ciaian and Swinnen

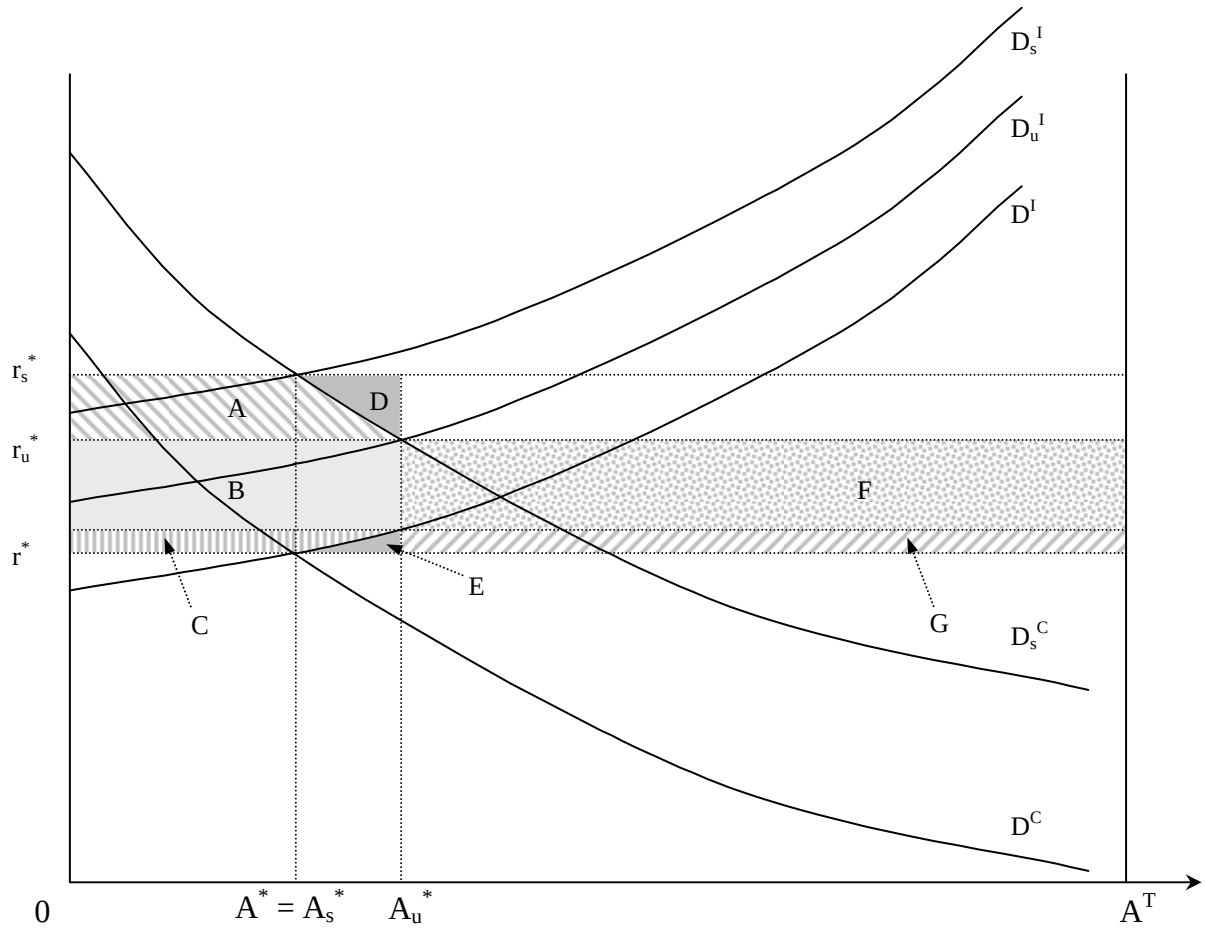

Figure 5. Effect of unequal subsidies (without imperfect competition and transaction costs) in the land market

To analyse the effect of this, assume that only some of the individual farms get area payments. This will result in a smaller shift of the aggregate IF land demand function. Define s^I as the "equivalent subsidy", i.e. the subsidy which would cause the same shift in the land demand function if all individual farmers get the same subsidy s^I. Figure 5 illustrates this situation. For simplicity, we start from Figure 3 where we assumed no transaction costs and perfect competition. The result of unequal subsidies is that the new demand curve D_u^I is below the D_s^I curve, while the CF demand is still represented by D_s^C. The new equilibrium is now at (A_u^*, r_u^*). Notice that the land allocation changes: A_u^* is to the right of $A^* = A_s^*$. Corporate farms use more land and individual farms use less.

Total subsidies allocated are area ABCDE (to CFs) and F (to IFs). A large part of the subsidies still end up with landowners through an increase in land rental rates, equal to area BCEFG. Individual farmers lose out because the land rental price increases more than the subsidies they get: $r_u^* - r^* > s^I$. Their losses equal area EG. Corporate farms gain because the increase in rental prices is less than the subsidies they receive: $r_u^* - r^* < s$. Their gains equal area A. As subsidies now induce distortions in the allocation of land, there are deadweight costs, equal to area D and E. Obviously, the relative sizes of these effects depend on the elasticity of the demand curves and on the difference in the subsidies.

Similar conclusions follow when including transaction costs and market imperfections (Figure 6). We start from Figure 4 where transaction costs, market imperfections and equal access to subsidies were assumed. For unequal subsidies the new marginal costs function, MC_u^C, along which the CF decides on the quantity of land rented, is below the MC_{ts}^C. This leads to a new equilibrium (A_u^M, r_u^M) and a change in the allocation of land. Corporate farms use more land $(A_u^M > A_t^M = A_{ts}^M)$ and individual farmers less. Total subsidies allocated at the equilibrium are ABDE. A substantial part of these still go to landowners through increased rental prices, equal to area BDEF. Individual farmers lose, while

corporate farms gain. The losses to individual farmers equal area DF and the gains to corporate farms equal area AC. Because the CF uses its market power, it rents less land than socially desirable (see Figure 2). However, unequal subsidies make it profitable for the CF to use more land. This leads to a land allocation that is closer to that under perfect competition. If the difference in subsidies obtained by the CF and IF is sufficiently large, the CF could use more land than under perfect competition.

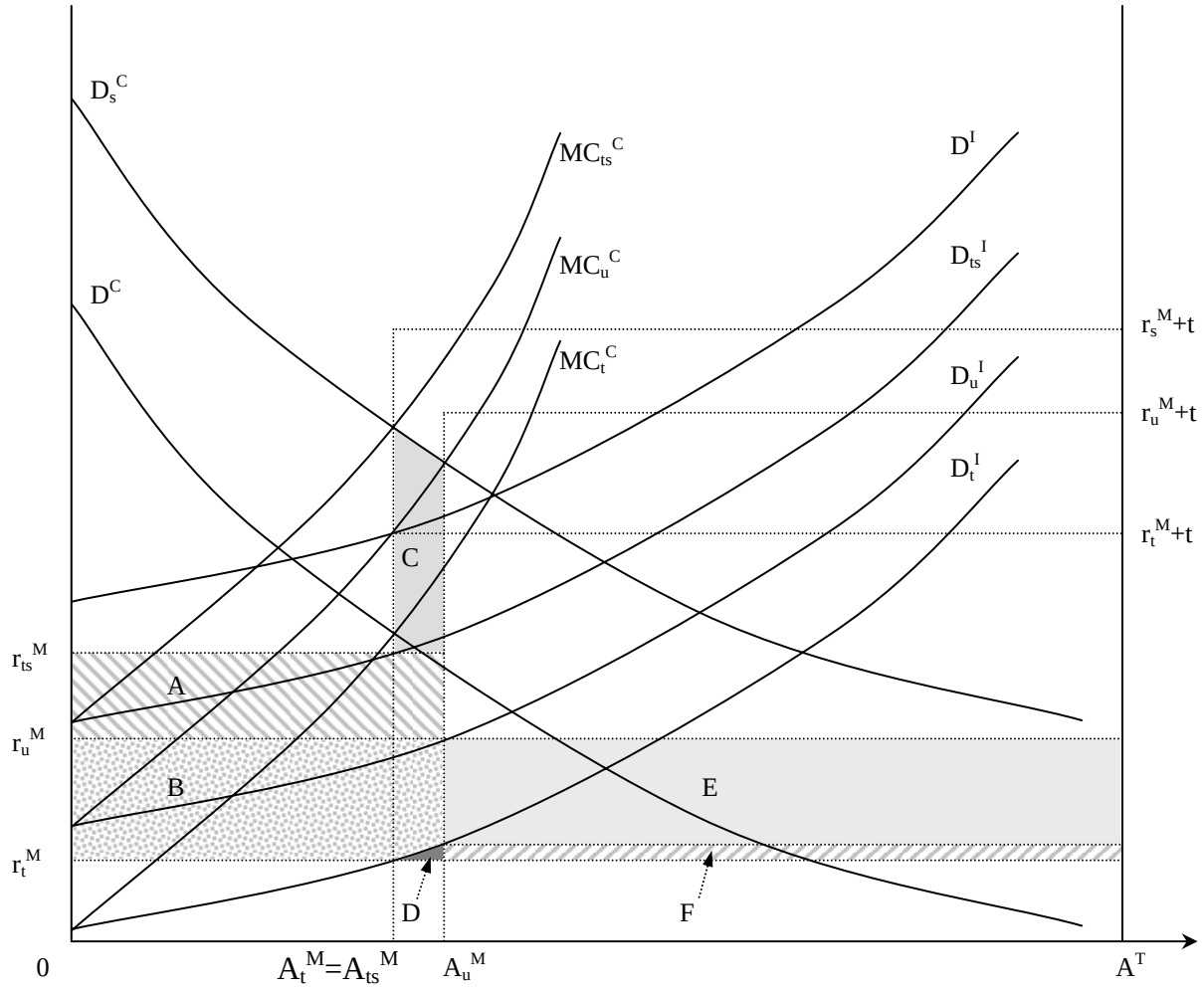

Figure 6. Effect of unequal subsidies with imperfect competition and transaction costs in the land market

Impact of the 2003 CAP reform

In 2003 the EU decided to decouple CAP subsidies beginning in 2005. In terms of our model, subsidies will be given as a fixed set of payments per farm, so-called single farm payments (SFP). The SFP for a specific farm equals the support the farm received in the previous "reference" period. The SFP is an entitlement, but future payments depend on the farm operating an amount of "eligible hectares" equivalent to the size of the entitlement.

Specifically, define E^C as the total payment for the corporate farm after CAP reform, and A_E^C as the amount of eligible area for payments. Assuming that E^C equals the total subsidies the corporate farm received with the area payment system, and that all the land it used qualifies as eligible land, we have $E^C = A_E^C$. s, which is equal to area F, with $A_E^C = A_t^M$ in Figure 4. Making similar assumptions for the individual farms, $E^I = A_E^I$. s, where $A_E^I = A^T - A_t^M$, which equals area G in Figure 4. Hence, payments per eligible hectare, e, are equal in this case: $e = e^C = e^I$.

The policy reform has important impacts on the distribution of policy rents. The first implication is that policy rents shift from landowners to farms with the new CAP support system.

Proposition 3: *Decoupled single farm payments benefit only farms, with and without land market*

imperfections.

The corporate farm and individual farmers are not granted payments for the land that they rent above the eligible area, A_E^C and A_E^I respectively. Consider first the case when the IFs want to rent more land, $A^I > A_E^I$. Since the total land supply is fixed, it implies that the CF would then rent less land than its eligible area, $A^C < A_E^C$. In this case the respective land demand functions are determined by:

(9) $pf_A^I = r + t(A^I)$

(10) $pf_A^C + e = r + A^C \frac{\partial r}{\partial A^C}$

For the extra land (area $A^I - A_E^I > 0$), IFs cannot pay more than the marginal production value of the land. In contrast the CF is willing to pay a higher rent, up to e more.

Secondly, consider the case when land rented by IFs is less than the eligible area, $A^I < A_E^I$ and $A^C > A_E^C$. The demand functions are then defined by:

(11) $pf_A^I + e = r + t(A^I)$

(12) $pf_A^C = r + A^C \frac{\partial r}{\partial A^C}$.

In this case the reverse logic holds. The payments increase the IF land demand. The rent that IF is willing to pay is increased by e.

Equations (9) and (11) for IF and equations (10) and (12) for CF imply kinked land demand functions with the SFP. Consider Figure 4 again. Starting in the left hand side of the Figure and following the thick lines, IF demand is given by D_t^I D_{ts}^I while CF demand is given by D_s^C D^C. The CF marginal cost function is also kinked. For the land area $A_E^I = A^T - A_t^M$ or lower, the CF marginal cost function is given by thick line MC_{ts}^C. For $A^I > A^T - A_t^M = A_E^I$, the CF marginal cost is represented by thick line MC_t^C. At A_t^M the demands and CF marginal costs are represented by thick vertical lines.

The equilibrium with SFP is (A_t^M, r_t^M). Compared to the area payments, the land allocation is the same $A_t^M = A_{ts}^M$, but the rental price is lower: the rent will decline from r_{ts}^M to r_t^M. When the CF rents marginally more land than A_t^M, it is willing to pay only r_t^M (determined by $D^C = MC_t^C$). Similarly, when IF wants to rent marginally more than $A^T - A_t^M$, the rent that IF is willing to pay is r_t^M (given by D_t^I). The equilibrium land rent will be r_t^M. Farmers gain all the subsidies, equal to area FG. The gains to the corporate farm equal area F and the gains to individual farms equal area G.

This result is conditional on how potential new entrants to farming are treated. With support now linked to current farms, new farmers (who are potentially more dynamic and productive and therefore a source of growth) are excluded from benefiting from the support system. These problems appear particularly problematic in the NEMS where major farm restructuring continues to take place, and is required to stimulate the productivity of the farm sector. To address some of these concerns, it was decided to create a 'reserve' to grant subsidy entitlements to new entrants. It turns out that these reserve entitlements can have an important impact on the total distribution of policy rents.

Proposition 4: *Benefits of SFP will shift to landowners when new entrants are eligible for SFP entitlements, with and without land market imperfections.*
Proof: see Ciaian and Swinnen.

The introduction of SFP entitlement to new entrants will induce a rise of the land rental price from r_t^M to r_{ts}^M. The rise is equivalent to the per hectare payment e. The reason is that there is an increased demand at the margin. Landowners may rent their land to new entrants if the tenants do not pay this price. In the above case, up to area A_E^C ($=A_t^M$) only incumbent CF could use e to bid up the rent, while for the rest of the area, A_E^I ($=A^T - A_t^M$)), only incumbent IF were able to do the same. New entrants were not eligible for e. However, if new entrants are eligible for SFP, their marginal benefit of cultivating land equals the marginal value product of land plus per hectare payment e. So, a new entrant is willing to offer the landowner a higher price for the land. But the farm (either CF or IF) that

currently uses the land is willing to offer to the landowner a price up to $r_t^M + e$ (see Figure 4). Hence, the new entrant and the farm will bid until the rental price reaches $r_{ts}^M = r_t^M + e$.

If the reserve for new entitlements is temporary, there will be an impact on the dynamics of rents. At the time of the SFP introduction the rental price will rise to $r_{ts}^M = r_t^M + e$, because there will be a demand from new entrants who are willing to pay this price. However, when the reserve is exhausted this demand will disappear and the price will return to its pre-reform period level to r_t^M.

In summary, the availability of reserve entitlements for entrants makes that the effects of the new CAP system are very similar to the effects of the old CAP system. When the reserve entitlements stop, the effects shift dramatically. In reality, farm managers, new and current, may have some expectation on when the reserve runs out and rational agents will take this information in consideration. The dynamics of the rental price will reflect this, smoothing the price changes.

EU accession, CAP reform, and farm restructuring

Accession to the EU will not only affect the benefits which the NEMS farms will receive, but also the market imperfections themselves. In particular, one should expect transaction costs in factor markets, including the land market, to decline, at least gradually, with EU accession. This will be due to a combination of factors, such as legal and institutional requirements for EU accession which improve the legal and institutional framework in which land market transactions occur. Improved profitability in farming from enhanced productivity of the farms and subsidies will also stimulate land transactions and thereby improve experience, transparency, and understanding of the market.

Such improved functioning of the land market through reductions in transaction costs will stimulate farm restructuring, transferring land use from less efficient to more efficient organisations. In terms of our model, this implies a shift of land use from the corporate farm to individual farms. To see this consider Figure 1.[1] The equilibrium in the land market with transaction costs of t_2 is (A_{t2}^*, r_{t2}^*). With transaction costs of t_1, the equilibrium shifts to (A_{t1}^*, r_{t1}^*), or when transaction costs fall to zero, the equilibrium is (A^*, r^*). This implies that land is moved from less productive use by the corporate farm to more productive use by individual farms – the difference in marginal productivity at (A_{t2}^*, r_{t2}^*) equals t_2 – up to the point where the marginal productivity in both types of farms is equal. Furthermore, with increased marginal productivity of land at the equilibrium, equilibrium land rents have increased with falling transaction costs. These results hold in a situation where there are no subsidies. How do CAP subsidies affect this efficiency-enhancing effect of EU accession?

Proposition 5:

a. Area payments have no effect on productivity enhancing restructuring in NEMS.
b. Reform to single farm payments constrains restructuring.
c. Making SFP available to new farms will stimulate restructuring, but cause a transfer of policy rents from farms to landowners.
Proof: see Ciaian and Swinnen.

First, let us look at the area payments. Figure 7 is an extended version of Figure 1 illustrating this case. As in Figures 3-6, the subscript s of various curves refers to their shape with area payments s. When such payments are introduced, the initial equilibrium with transaction costs t_2 shifts from (A_{t2}^*, r_{t2}^*) to (A_{t2}^*, r_{t2s}^*). The reduction in transaction costs from t_2 to t_1 shifts the equilibrium to (A_{t1}^*, r_{t1s}^*) and with no transaction costs (t=0), the equilibrium is (A^*, r_s^*). Notice that the restructuring with the area payments is identical to the restructuring without subsidies. With transaction costs falling to t_1, land use by individual farms increases from $A^T - A_{t2}^*$ to $A^T - A_{t1}^*$ and further to $A^T - A^*$ when transaction costs go to zero. Hence, the area payments have no effect on the restructuring process.

The effect of the SFP on restructuring is different. The eligible area in the case depicted in Figure 7 is $A_E^C = A_{t2}^*$ for CF and $A_E^I = A^T - A_{t2}^*$ for IF. As we explained before, in this case the demand curves of IF and CF are kinked, with a shift occurring at A_{t2}^* for initial transaction costs t_2. The equilibrium is at (A_{t2}^*, r_{t2}^*). Consider now what happens if transaction costs decline from t_2 to t_1. The kinked land demand curve of IFs shifts up by $\Delta t = t_2 - t_1$. This results in a relatively large change in the rental price, but no change in land allocation. The new equilibrium is (A_{t2}^*, r_{t1e}^*). The increase in rental price $(r_{t1e}^* - r_{t2}^*)$ is identical to the decline in transaction costs $t_2 - t_1$, which is larger than with area

payments. The reason is that there is no land reallocation because the decline in transaction costs is insufficient to overcome the gap in subsidies between CF and IF for land renting beyond A_{t2}^*. Even with reduced transaction costs, the marginal value of additional land for the IF at A_{t2}^* is equal to r_{t1e}^*, which is less than r_{t2s}^*, which is the marginal value of land for the CF at A_{t2}^*. Only if the reduction in transaction costs (Δt) is larger than the per unit subsidies (e) there will be restructuring. To see this, consider what happens when transaction costs fall to zero with $\Delta t = t_2 > e$. Now the IF demand curve shifts from D_{t2}^I to D^I for land allocations to the left of A_{t2}^*, resulting in a new equilibrium (A_e^*, r_e^*). The decline in transaction costs is now so large that it more than offsets the subsidy gap at the margin at A_{t2}^* and IFs will rent more land despite the subsidy gap. This results in restructuring, but less than without subsidies or with area payments. Land use by IFs increases by only $A_{t2}^* - A_e^* < A_{t2}^* - A^*$.

Hence, while some restructuring takes place, it is clear that this is less with SFP than with area payments. In other words, CAP reform will reduce farm restructuring and will restrict productivity gains associated with it. The old CAP system would yield the largest change in land allocation from IF to CF. The SFP may even lead to a total freeze of farm structures if subsidies are large compared to the reduction of transaction costs.

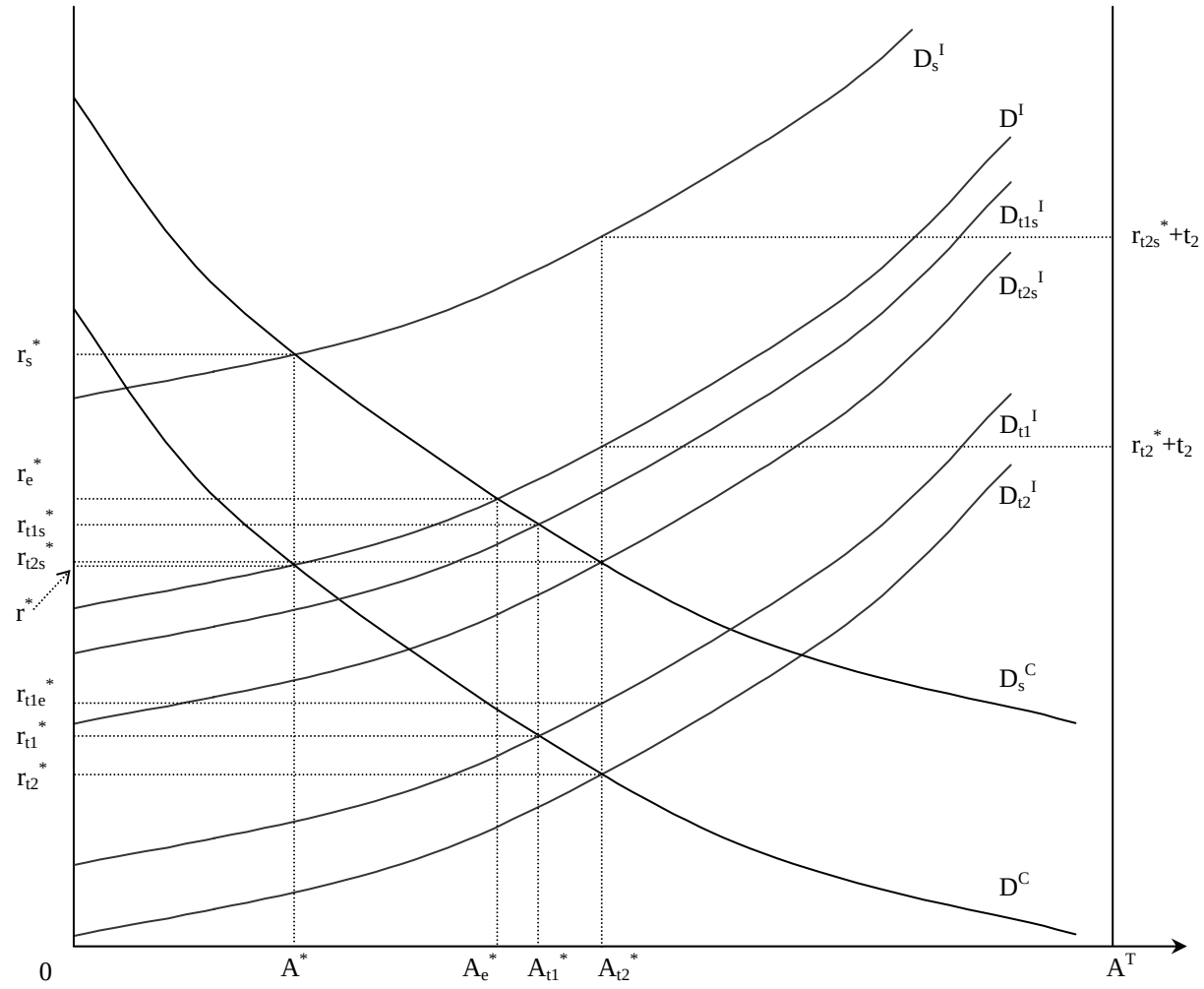

Figure 7. Effect of area payments and SFP on restructuring

Finally, attempts to address this problem by making new individual farms eligible for SFPs will stimulate farm restructuring but simultaneously induce a shift of policy rents from farms to landowners. The logic is analogous to that of proposition 4. The introduction of additional subsidies for new entrants effectively transforms the SFP situation into an area payments effect at the margin, stimulating more restructuring, but pushing up rental prices as well, shifting CAP benefits to landowners.

In summary, while the introduction of CAP reform in the NEMS will shift CAP benefits from landowners to farms there is an important trade-off. Restructuring which is needed to increase the competitiveness of the NEMS farm system will be constrained. Granting the SFP to new entrants mitigates this problem, but will simultaneously induce a transfer of policy rents to landowners.

Discussion and Conclusions

Eastern enlargement of the EU implies integration of the agricultural economies of the NEMS into the CAP. As a consequence farmers in the NEMS will receive area payments for the land they use, gradually increasing over a transition period. In well-functioning land markets such payments typically become capitalized into land values, mainly benefit landowners and lead to increases in input costs for farmers. However, NEMS rural land markets are characterized by important imperfections.

In this paper we have shown that, as long as there is competition from individual farms, domination of the land market by corporate farms and transaction costs will not affect the result that CAP subsidies result in increases in land prices and benefit landowners rather than farmers. Furthermore, if the land payments are distributed unequally, for example because of problems of small farms in fulfilling the requirements, these farmers (especially tenant farmers) may be net losers from the subsidies, while large corporate farms and landowners will gain. In the last part of the paper, we show how the 2003 CAP reform has both positive and negative efficiency effects in NEMS. While distortions are reduced and policy rents are shifted to farmers, restructuring of the farms is blocked. Mitigating this effect through reserve entitlements causes a reduction in subsidy benefits for farmers as land prices increase.

We should caution about simplistic interpretations of our results. How the effects analyzed in this paper affect rural households in the NEMS depends on whether those households are landowners or farmers, or both, and on the importance of corporate farms. Sructural conditions differ strongly between NEMS. For example, farming in countries like Slovakia and the Czech Republic is concentrated on large-scale corporate farms, who rent most of their land. In Slovakia, CF use 88% of farmland. More than 90% of total land used by CF and by IF is rented. Land ownership is very fragmented and many landowners live in urban areas. In contrast, in countries such as Poland and Slovenia, farming is dominated by small family farms (IFs), owning most of the land. In Poland, IFs cultivate around 87% of the total land and own most of the cultivated land. Thus, many farmers are also landowners in Poland. That said, it should be noted that (1) there are generational differences, as the most dynamic farmers are typically younger and land ownership is typically concentrated in older rural households, and (2) that there are important regional variations: in the north and western regions of Poland, larger farms operate on rented (former state farm) land (Csaki and Lerman; Dries and Swinnen, 2002). Most other countries, such as Hungary and Bulgaria, have a mixed structure. For example, in Hungary, IFs use 59% of farm land and CF use 41%. CF rent most of the land they use, while individual farmers operate on a mixture of owned land and rented land. The share of rented land typically increases with the size of the IF (Vranken and Swinnen). Many land owners are living in urban areas, but land ownership is less fragmented than in Slovakia.

Taking these facts into consideration, the implications of our analysis are different for these countries. The most striking difference is between countries such as Poland and Slovakia. For most farms in Poland, leakages of policy rents to land owners is less of a problem since the dominating farm model is IFs who themselves own the land. There are some problems of rents being concentrated with older farmers who are typically the owners of land. In contrast, for many farms in Slovakia and Hungary increased rental rates with the introduction of area payments have a significant impact. Interestingly, there was a persistent view in the 1990s that “land markets are not working” and “prices are very low”. All this has changed dramatically since 2002. The anticipated implementation of CAP payments has strongly pushed up land prices and rental rates in Slovakia and Hungary. In both countries, land owners are benefiting from this, but to a larger extent in Hungary than in Slovakia. In Slovakia, large farms are more dominant and have more market power. In addition, fragmentation is more excessive and the concentration of land owners in the cities is stronger. In combination, these factors increased transaction costs for land owners, and reduced their gains. Despite this, CF managers in Slovakia, and in other countries such as the Czech Republic, have started lobbying the government to introduce regulations of land rental prices, which they claim is “unfairly benefiting urban land

owners". An alternative strategy by CF managers was to lock land owners into long term contracts before land prices started increasing. Surveys show that land rental contracts with CF in Slovakia and the Czech Republic are typically longer than with IFs (Swinnen and Vranken).

The smallest farms in countries such as Slovakia and Hungary may suffer from the subsidies, as they may not get access to these yet face increased land prices. In addition to the administrative hurdles, there is a regulatory limit of one hectare in order to apply for subsidies. However, this disadvantage may be limited as the smallest farms often use their own land for farming.

The shift from area payments to decoupled single farm payments is planned in a few years in NEMS. The impact on income distribution will be limited in Poland but be significant in Slovakia and Hungary. Large CFs are likely to benefit very strongly from decoupled farm payments, as rents are likely to fall and large income transfers will benefit them directly.

Finally, this change in subsidy instruments may have an undesirable effect on restructuring, which is important for increasing the competitiveness of the farm sector in the NEMS. The shift to SFPs will limit pressures for restructuring. In some of the countries, especially Slovakia and Czech Republic, this is likely to constrain much needed further restructuring of some of the corporate farms. The subsidies will increase rapidly over the 2005 – 2013 period and will be large by the time of the SFP introduction, possibly outweighing the gains in transaction cost reductions. In that case the constraining effect may be very strong.

Finally, an important issue which needs further analysis is the interaction of land market imperfections and the subsidy systems with other market imperfections, in particular in labour and credit markets. It is well known that such imperfections have an important impact on land allocation and farm structures in NEMS (see eg. Rizov and Swinnen; World Bank, 2001). There are interactions between these imperfections and the subsidy effects. For example, subsidies that increase land prices are likely to reduce credit constraints by improving collateral options. Also, labour market constraint will certainly affect the farm restructuring impact of the various subsidies. These interactions between various factor market imperfections and the subsidy effects are complex and beyond the scope of analysis in this paper. This is the topic of our future research.

Notes

1. Since the argument here is about the impact of the reduction in transaction costs, we limit our argument to the perfect competition model – the imperfect competition analysis can be obtained from the authors.

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